

## REMARKS

### Regarding the Claim Amendments:

The amendments to the claims add no new matter. Claims 1 and 7 have been amended:

- (1) To include the limitations of claims 4 and 5;
- (2) To require that the autothermal dehydrogenation (B1) is carried out in the presence of co-fed oxygen - support for this amendment is given on page 7, lines 17-26; and
- (3) To require that the autothermal dehydrogenation (B1) is carried out in the presence of a dehydrogenation catalyst comprising platinum and/or palladium - support for this amendment is given on page 10, lines 8 – 17 of the specification.

### Regarding previous Claim Rejections:

Claims 1 – 7 stand rejected under 35 U.S.C. §103(a) as obvious over Dutcher (USPN 2,438,041) in view of Adams et al. (USPN 3,161,670).

As admitted by the examiner, Dutcher “does not disclose how the butadiene is derived [nor does it disclose] using a butadiene feed which is produced from butane.”<sup>1</sup> Yet, the examiner argues that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the disclosure of Dutcher by providing a butadiene feed produced from butane as disclosed in Adams et al. The arguments presented in the reply of August 21, 2006 are hereby incorporated by reference.

Moreover, the amendments to the claims presented above further emphasize the differences between any combination of the disclosures of Dutcher and Adams et al. and the present invention.

To establish a *prima facie* case of obviousness, three basic criteria must be met:

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<sup>1</sup> Page 3, lines 13 – 14 of the final Office action of April 25, 2006.

1. There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings,
2. There must be a reasonable expectation of success, and
3. The prior art reference (or references when combined) must teach or suggest all the claim limitations.

The combination of references cited by the examiner fails to teach or suggest all the claim limitations, because Adams et al. neither teaches nor suggests the two-step dehydrogenation of the inventive process, wherein the first step (B1) is carried out autothermally in the presence of added oxygen and a catalyst containing platinum and/or palladium. In fact, Adams et al. disclose a two-step dehydrogenation process, wherein the first step is carried out in the absence of oxygen. Adams only discloses admitting air or an oxygen containing gas in the second stage (See: column 3, lines 61 – 67).

Additionally, Adams et al. disclose a two-step dehydrogenation process, wherein the first step is carried out in the presence of a catalyst containing  $\text{Cr}_2\text{O}_3$  on  $\text{Al}_2\text{O}_3$  (See: column 3, lines 27 – 45). In light of this failure of the cited references to teach or suggest all of the claim limitations, a *prima facie* case of obviousness has not been established.

Moreover, the examiner has not pointed to an appropriate suggestion or motivation, to modify the disclosure of Adams et al. First, Adams et al. teach away from the two-step dehydrogenation of the inventive process, wherein the first step (B1) is carried out autothermally in the presence of added oxygen. As discussed above, Adams et al. disclose a two-step dehydrogenation process, wherein the first step is carried out in the absence of oxygen and only discloses admitting air or an oxygen containing gas in the second stage. Second, Adams et al. disclose a two-step dehydrogenation process, wherein the first step is carried out in the presence of a catalyst containing  $\text{Cr}_2\text{O}_3$  on  $\text{Al}_2\text{O}_3$  and not a catalyst containing platinum and/or palladium. The examiner has not pointed to a suggestion or motivation to modify the disclosure of Adams et al. in this regard. Due to this lack of a suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the disclosure of Adams et al. a *prima facie* case of obviousness has not been established.

Finally, the examiner has not provided any basis upon which to conclude that a person of ordinary skill in the art at the time the invention was made would have had a reasonable expectation of success after making the modifications that would have been necessary to arrive at the present invention. In fact, a person of ordinary skill in the art at the time the invention was made would probably have feared that the examiner's proposed modification to the disclosure of Adams et al. would be extremely hazardous. Adams et al. take great care to note that "it must be remembered that the explosive limits of hydrogen and oxygen are generally quite wide and the oxygen concentration at any point in the reactor should be maintained below such explosive limit."<sup>2</sup> Thus, because a person of ordinary skill in the art would not have had a reasonable expectation of success, a *prima facie* case of obviousness has not been established.

Respectfully submitted,  
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<sup>2</sup> Column 4, at indicated lines 14 – 17 of Adams et al.